IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF MISSISSIPPI
JACKSON DIVISION

Homebuilder Association of Mississippi, Inc.
Homebuilder Association of Jackson, Inc.
and R&S Developers,
Plaintiffs

v.
City of Brandon, Mississippi
Defendant

CIVIL ACTION NO. 3:07-CV-716WHB-LRA

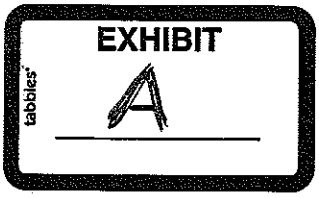
Expert Report of Charles D. Cowan, Ph.D.

Pursuant to 20 U.S.C. § 1746, Charles Cowan declares the following:

1. I was retained by the City of Brandon, Mississippi, to examine whether Zoning Ordinance Amendments passed in 2006 requiring a minimum size in square footage in new homes and a minimum lot area would have a disparate impact on minorities.

2. I have personal knowledge of the matters contained in this declaration. My background covers 30 years of research and study in the areas of statistics, economics, and their application to business problems. I am Cofounder of Analytic Focus LLC, a company headquartered in Birmingham, AL with offices in San Antonio, TX and Washington, DC.

3. Prior to starting Analytic Focus LLC I served in the Federal government in a number of different positions in different agencies. I also served as a Director for Price Waterhouse where I headed the Financial Services Group in the Quantitative Methods Division. I also hold a position as a research professor in the School of Public Health at the University of Alabama – Birmingham (UAB) and previously served as a professor in the Business School at UAB. I've previously served as an adjunct professor of statistics at the George Washington University and the University of Illinois.



4. A listing of my qualifications as an expert in this case are presented in Appendix 1. My complete resume and a listing of all my publications are presented in Appendix 2. A listing of past cases in which I have been deposed or presented testimony at trial is presented in Appendix 3. Documents relied on in preparation of this report are listed in Appendix 4.

Scope of Assignment & Compensation

5. I was asked to consider the claims made by plaintiffs in the above-referenced case and to offer an opinion on whether establishing a minimum size for new home would have a disparate impact on minorities. Using standard analytical techniques, I was able to determine whether such a restriction could be reasonably expected to have a disparate impact on minorities. This declaration considers these issues. Compensation is at the rates set forth in the following table.

Personnel	Fees per Hour
Charles Cowan, Ph.D.	$425
Senior Financial Analyst	$375
Senior Research Associate	$295
Programmer	$195
Research Analyst	$ 95

For expert representation, depositions and testimony, our hourly rate is $495. Out-of-pocket expenses, including travel, are billed separately and are in addition to the hourly fees.

6. The conclusions drawn in this declaration are based on the information I had available as of the date of this report. I recognize that there is a possibility that there is other information that could be obtained from other sources that would bear on my opinions, so I reserve the right to extend these opinions or form new opinions should new information become available.

Claims Being Addressed

7. The initial question I was asked by the City of Brandon was whether the claims by the plaintiffs were correct and why I reached my conclusion. The claims I was asked to consider are found in the complaint for Declaratory Judgment, Injunctive Relief and Damages, dated November 7, 2007.

8. The claims are summarized at the beginning of the complaint and reproduced here:

> *1. This is a civil action for declaratory judgment, injunctive relief and damage against the Defendant, Brandon, regarding conduct undertaken by Brandon in adopting a series of amendments to its Zoning Ordinance applicable to the construction of single family residences. The amendments adopted by Brandon at issue establish minimum floor space/square footage requirements (hereinafter "minimum floor space") requiring all new single family homes in Brandon to be larger, more expensive and less affordable/available to various segments of Brandon's population.* ***Brandon's zoning practices have necessarily and directly increased the cost of housing throughout Brandon, which will have an adverse and detrimental effect on Plaintiffs and on all members of Plaintiffs HBAM and HBAJ, will have a disproportionate impact on minorities, and will operate to deny affordable housing to minorities and/or other groups protected under the Fair Housing Act.***
>
> *2. Plaintiffs will show that the consequence of Brandon's zoning action establishing minimum floor space requirements for all single family residentially zoned districts throughout Brandon will have a* ***disproportionate impact on minorities and disproportionately exclude minorities from housing opportunities in Brandon*** *in violation of federal law. Plaintiffs will further show that* ***Brandon's actions in amending its Zoning Ordinance as addressed herein below do not operate in a manner reasonably related to any legitimate governmental purpose or interest,*** *and constitute nothing more than a pretext for driving up the size and cost of housing, in violation of federal law and in violation of the Plaintiffs' substantive due process and equal protection rights under the Fifth and Fourteenth Amendments of the United States Constitution and Article IV, Sections 14 and 17 of the Mississippi Constitution. Plaintiffs would further show that Brandon's amendments to it Zoning Ordinance establishing minimum floor space requirements also constitute a violation of the Fair Housing Act of 1968, 42 USC § 3601 et seq. ...*
>
> *17. Under the 2006 Amendment, detached single-family residences are now required/mandated to contain a minimum amount of floor space on a correspondingly minimum lot size as set forth herein below:*

	Zoning District	Minimum Floor Space	Minimum Lot Area
1	R-1	1,800 sq. ft.	12,000 sq. ft.
2	R-1-A	2,000 sq. ft.	43,500 sq. ft.
3	R-1-B	1,600 sq. ft.	8,500 sq. ft.
4	R-2	1,600 sq. ft.	8,500 sq. ft.
5	R-3	1,400 sq. ft.	4,000 sq. ft. (Townhouses) 6,500 sq. ft. (Zero Lot Line Dwellings)

(bolding added in quote above to highlight claims made)

9. The Plaintiffs make claims of disproportionate impact on minorities, but these claims carry with them a number of assumptions regarding both income and spending patterns for different race \ ethnic groups. The basic assumption made is that Blacks and other minorities have lower income, save and spend at lower rates, and that anything that costs more would necessarily be less available to Blacks and other minorities than to Whites.

10. A second implicit assumption is made that Blacks and minorities don't have the same choices in housing that all people do, which includes a variety of alternatives besides buying a newly constructed home. By focusing the complaint solely on new houses, the assumption is made that Brandon is somehow excluding minorities from making reasonable choices.

11. A third claim is that "requiring all new single family homes in Brandon to be larger, more expensive and less affordable/available to various segments of Brandon's population. Brandon's zoning practices have necessarily and directly increased the cost of housing throughout Brandon, which will have an adverse and detrimental effect on Plaintiffs and on all members of Plaintiffs HBAM and HBAJ". This assumes that the requirement to build a larger home will drive up the costs for the Plaintiffs. No other adverse and detrimental effect on Plaintiffs is claimed, so I am explicitly assuming the detrimental effect is financial.

12. A final assumption, found in the statement, "Brandon's zoning practices have necessarily and directly increased the cost of housing throughout Brandon", is also an assumption that can be examined as to its validity. There is no argument made that the cost of housing has increased throughout Brandon, other than what would be observed in normal appreciation of housing, and due to the activities of the city.

Obtaining Information

13. To examine the claims and the underlying assumptions of the claims made by the plaintiffs, we constructed a database using two data sources. The first is a set of records obtained from the Rankin county tax assessor for single family residential properties in the city of Brandon. These records were only available as a printout from the tax assessor's system, so we took all the records provided to us and created a large Microsoft Excel worksheet. The records from the tax assessor included the parcel ID number, owner, mailing address for the owner, location of the property, some sales and appraised values for sales recorded by the tax assessor, and appraised values for land and improvements, plus the dates of appraisal. The file also included assessed values, but these were not used for analysis.

14. The second data set was obtained from the U.S. Bureau of the Census, where we obtained numbers of persons by block group, numbers of persons within different racial groups for the same block groups, and the median income for all residents of each block group. Using the numbers of persons, we calculated the percent of minorities in each block group.

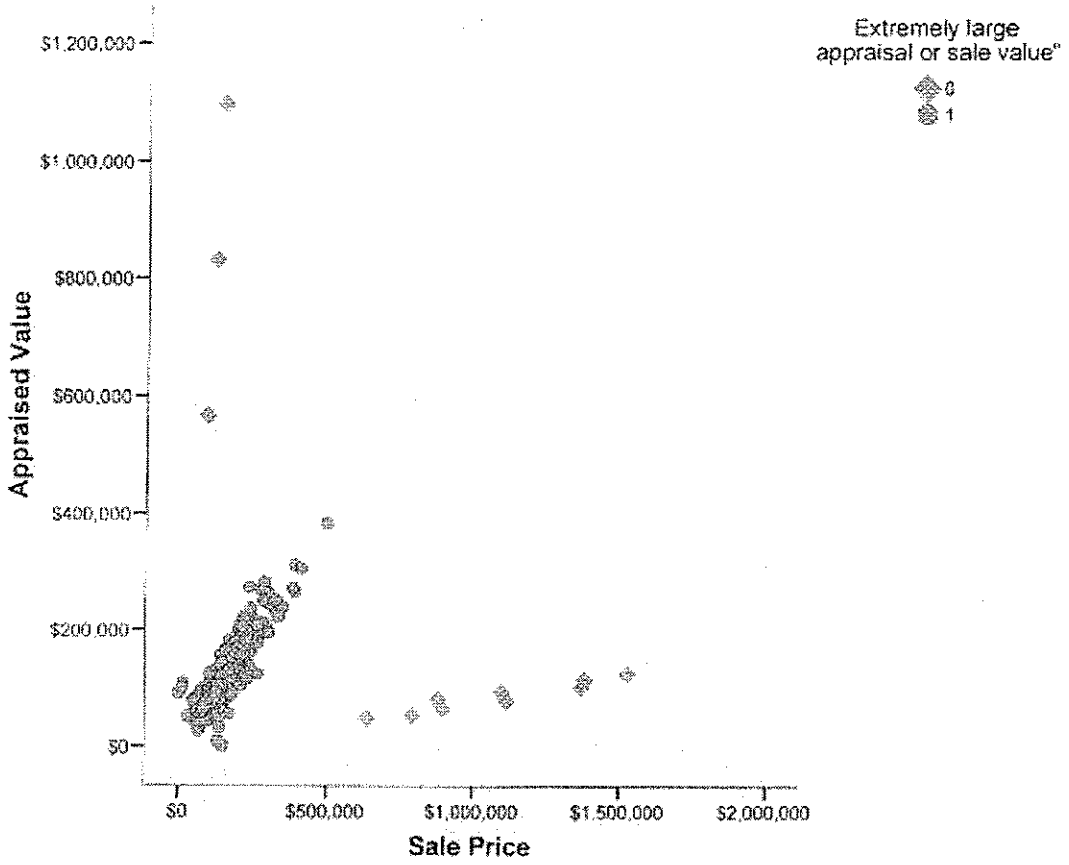
15. We mapped each property in the tax assessor data base to its corresponding Census Tract\Block from the 2000 Decennial Census of Population and Housing, and with the Block ID we were able to append the data for block groups to the tax assessors database. Note that there is no source of information that would give us the minority or the income for each individual in the city of Brandon. The only way to obtain such information from individuals would be to conduct a Census of Brandon, a costly and time-consuming enterprise.

16. This means that we do not have the individual incomes and minority status for each resident of properties in Brandon. In some cases, we would also expect that the resident in a property is not the same as the owner. Census Bureau data is for residents, not the owners.

17. A final issue is that the Census Bureau data is for a point in time – April 1, 2000. The tax assessor data is the appraised value tied to a sale, but the sale could have occurred at any time. This dilemma occurs for any analysis – unless minority status and income is collected from the purchaser at the time of sale of a property, there is no way to collect this data on a corresponding flow basis. This doesn't invalidate the analysis. Since there is no dataset available (nor could there be) that would satisfy all needs for measurement of minority status and income, we need to be aware of some necessary limitations that cannot be remedied.

18. In addition to the construction of this database, we also had to conduct some quality control operations on the data since there were some entries that were empty or there were items that were inconsistent. In particular, extreme values that fell outside what would be an obvious range were excluded. In Chart 1 below, I compare the sales price to appraisal value for a property. There are a few properties where the sale value is very high relative to the appraised value or where the appraised value is very high relative to the sale value. These are eliminated from the analysis.

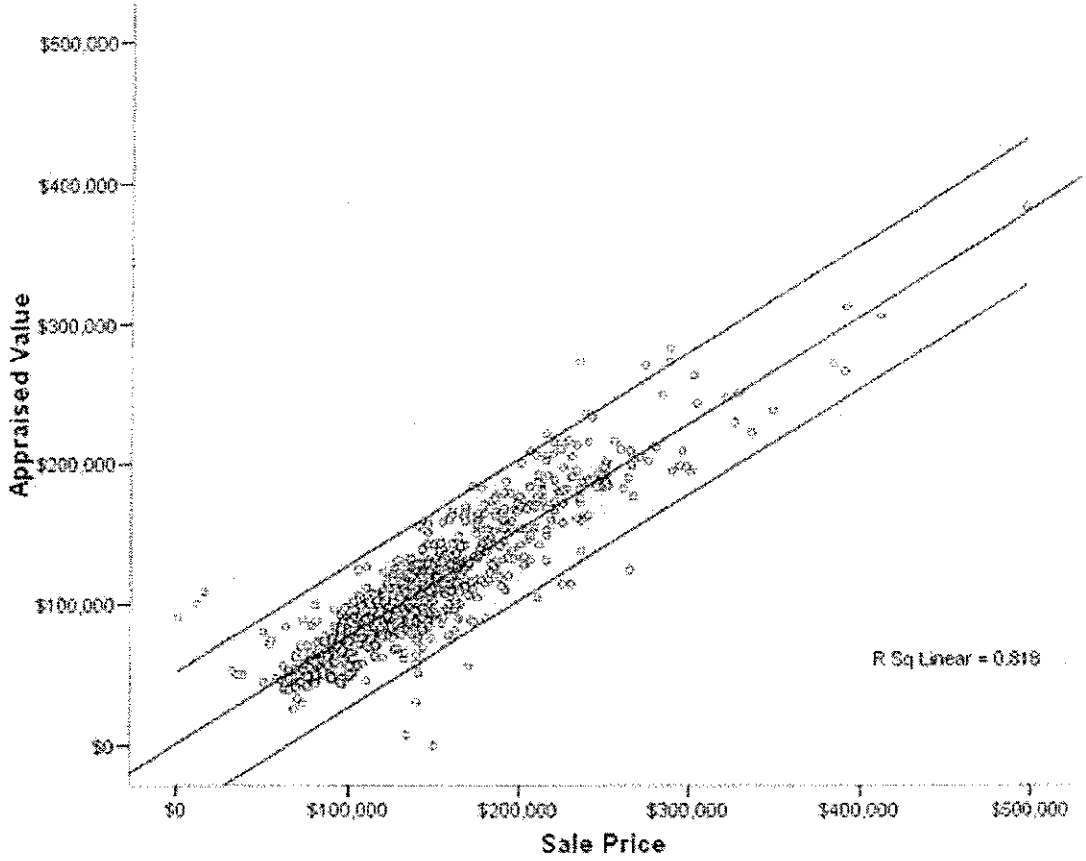
Chart 1: Scatterplot of Appraised Value by Sales Price



Characteristics of the Data for Brandon Properties

19. With the removal of a very few cases in the dataset (those noted above) we find the remainder of the data to be consistent. As an example, focusing on the sales\appraisal relationship again, we have the following relationship, where the appraisal is approximately 80% of the sales value. This relationship is shown by the straight line through the middle of the cluster of points in the chart, with the two lines above and below the cluster of points representing the 99% confidence range for predicted individual values to fall.

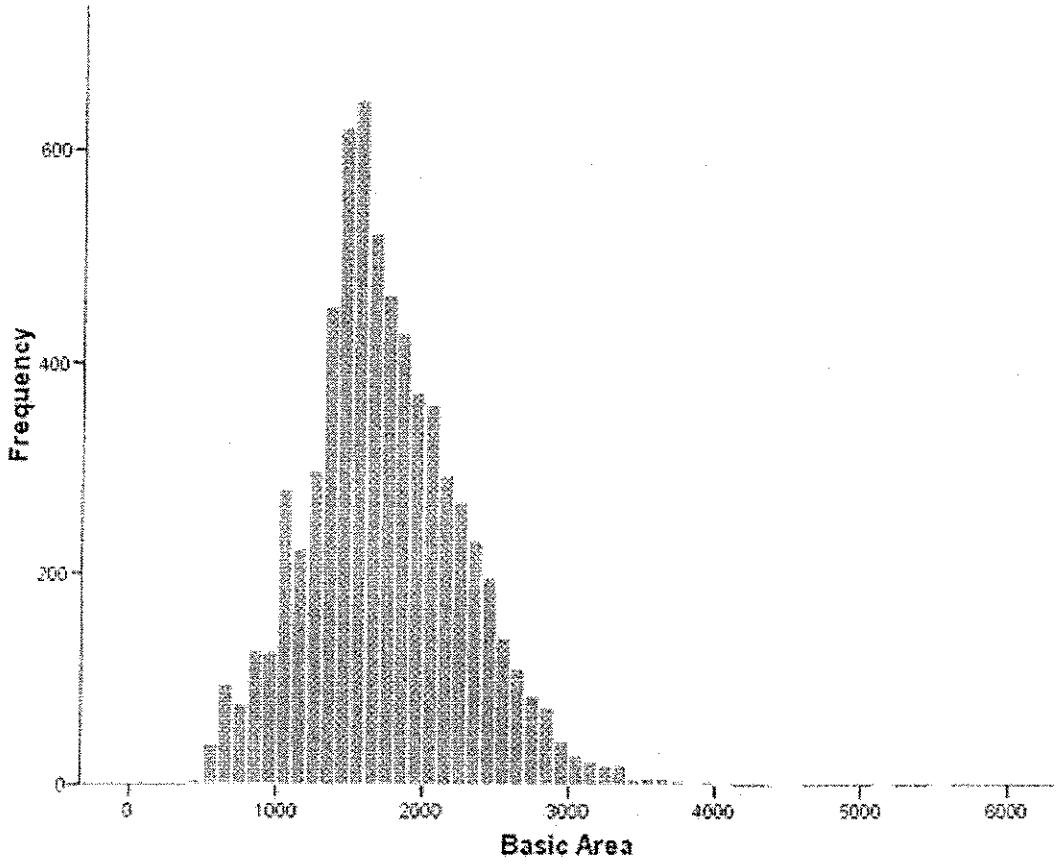
Chart 2: Total Appraised Values by Sales Price for Properties in Analysis



20. As we do not have sale prices for all properties but we do have appraised values, we use the appraised values in the analysis because of the consistency demonstrated between the two.

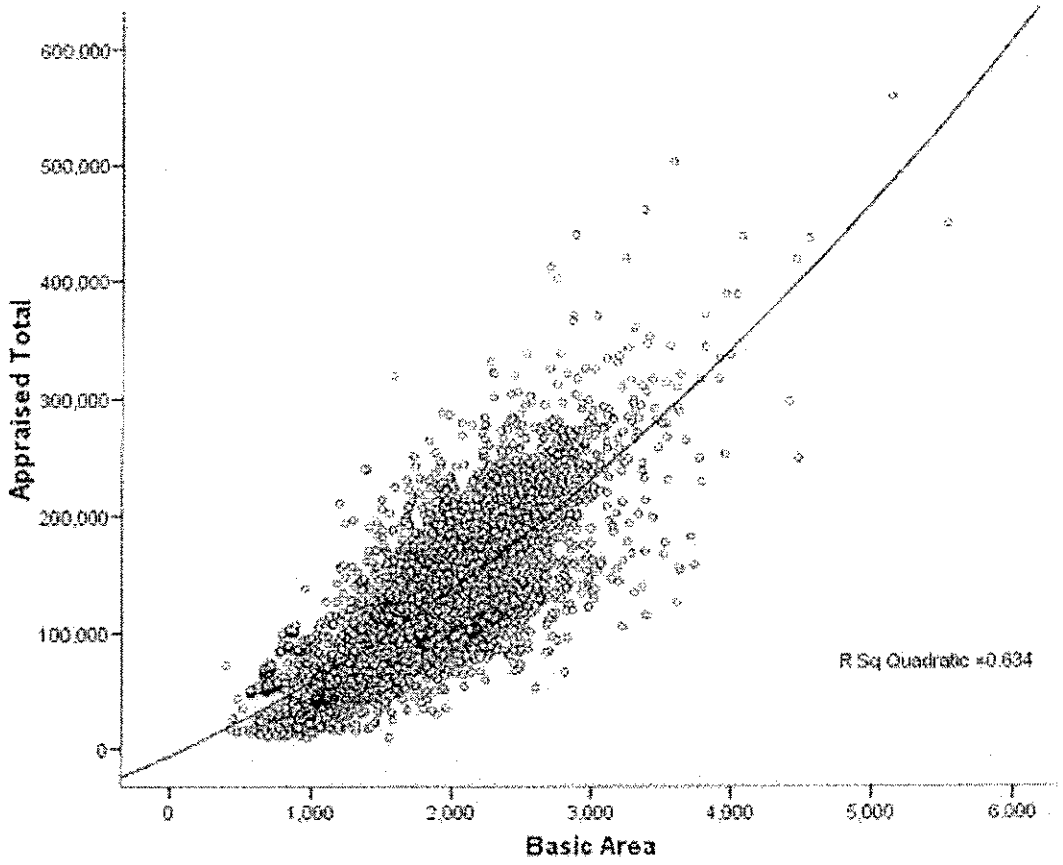
21. As the complaint is concerned primarily with the areal restrictions, we can also examine the relationship between the basic area and the appraised value of the property. Three charts help us to examine this relationship. The first is the distribution of the basic area in the property, shown in Chart 3.

Chart 3: Distribution of Properties in Brandon by Area (square footage)



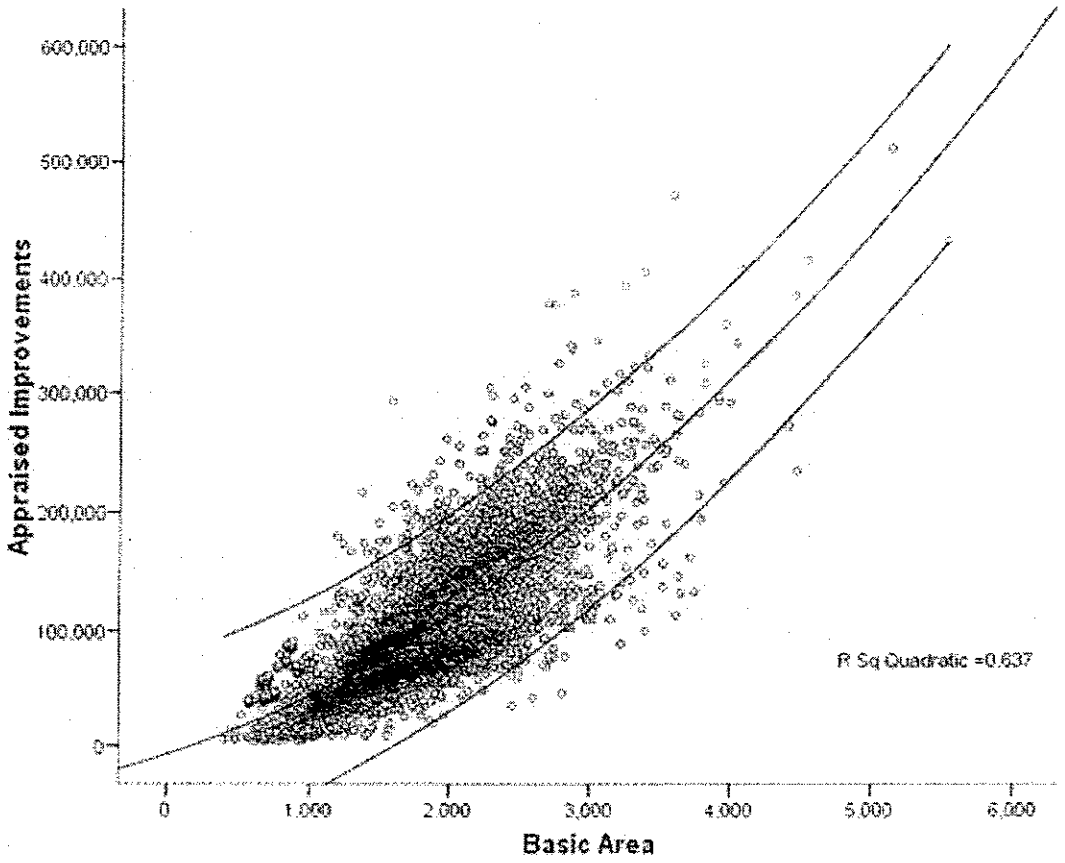
22. The second is the relationship of the basic area reported by the tax assessor to the total appraised value, and the third is the relationship of the basic area to the "improved value". The total appraised value is the sum of the improved value and the value of the land, and the basic area should be related primarily to the improved value since it is the improvement on the land.

Chart 4: Total Appraised Value by Basic Area of Property



23. The line through the chart is the best fit or prediction of the appraised total relative to the basic area. Note that this line is curved, a quadratic, and not a straight line.

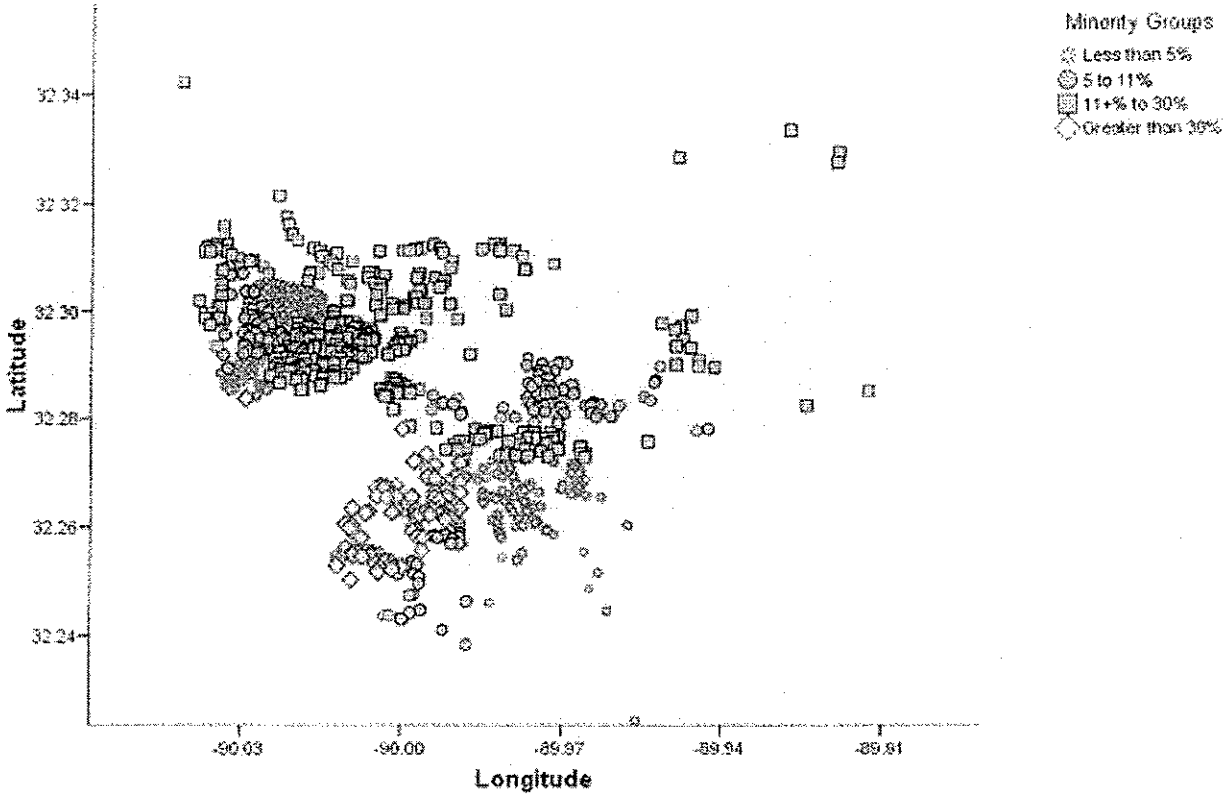
Chart 5: Appraised Value of Improvements by Basic Area of Property



24. The line through Chart 5 is again the best fit or prediction of the appraised total relative to the basic area. This line and the 99% confidence range around it (for individual predictions) is curved and reflects two effects. The first is that more area means more cost of construction, although one could argue that for larger properties the cost per square foot should decline because of economies of scale in construction. Under this scenario, cost would increase, but as a curved line with a diminishing slope, not an increasing slope. Offsetting these economies, however, is the increasing cost of better materials. As homeowners look for larger homes, they also look for better materials in construction, such as quartz countertops instead of Formica or better quality appliances.

25. Finally, to demonstrate the distribution of housing currently in Brandon, Chart 6 presents the locations of housing units in Brandon with the properties marked according to the minority density in the block group where the property is found.

Chart 6: Locations of Properties in Brandon



26. With a little imagination, one can see the distribution of the two major clusters of properties in Brandon, bisected by Interstate 20. There are two moderate clusters of housing where less than 5% of the properties are occupied by minorities – this is about 33% of the housing shown in the chart. This means that 67% of the housing is in areas that are 5% or more minority (with the average for Brandon being about 14% minority).

Claims and Assumptions

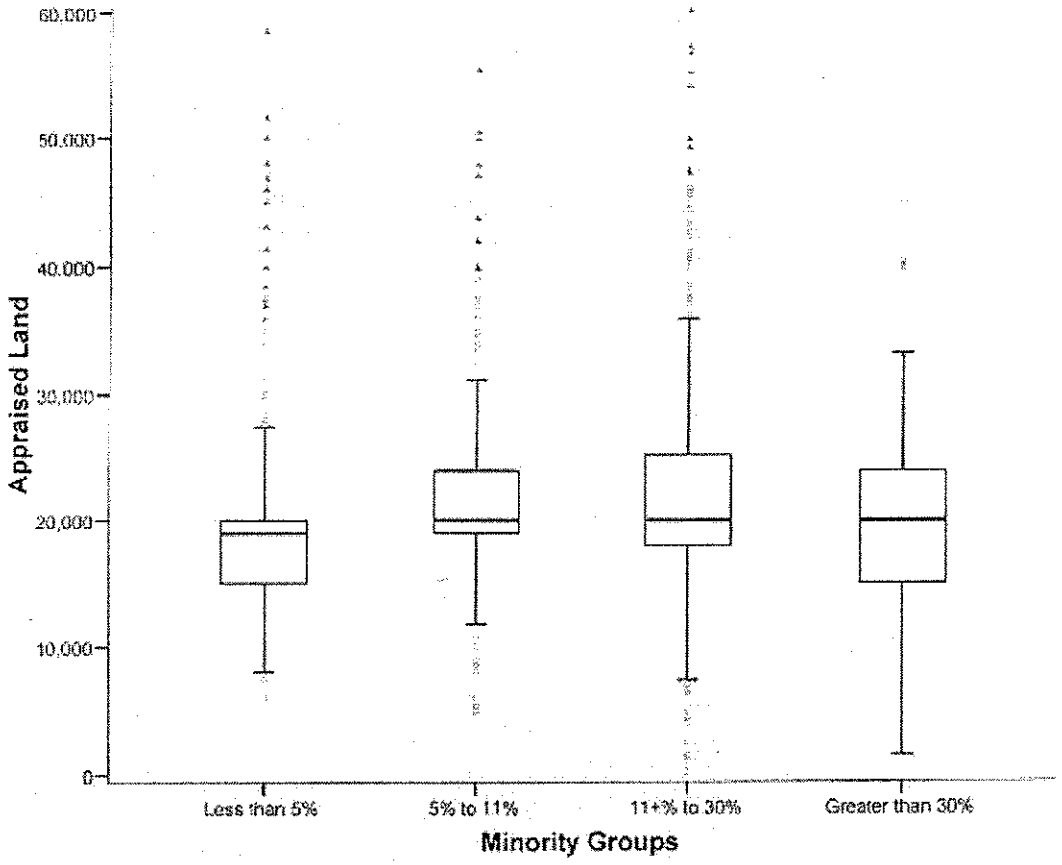
27. In response to the claims regarding disparate treatment of minorities, what follows is an analysis of property values in Brandon related to a number of factors, including race and income. In my analysis, I examine appraised land value first and then turn to improvements.

28. As for land, the tax assessors database as we received it did not include the amount of land, but it did include the appraised land values. If minorities were buying only smaller properties in Brandon, this would be reflected in land prices as they differed by density of minorities in the block groups. Chart 8 demonstrates this is not true – in Brandon, all four of the minority density groups have approximately the same median appraisal value for land.

29. In Chart 8, the box shown for each of the four groups gives the range representing the distribution of 75% of the properties in that group, with the bar cutting across the box giving the median for all property values. The T-bars extending from the boxes encompass another 10% on either side (top or bottom) of the box, extending the range to 95%. Circles and markers above and below the boxes represent the few cases that are outliers or extremes (respectively) in the distribution of the appraised land values. An outlier is considered to be in the tail 2.5% of each distribution (outside the 95% range with 2.5% on either side) and an extreme is in the tail 0.5% of each distribution (outside the 99% range with 0.5% on either side). There are few of these (hence the term extreme) relative to the bulk of appraised land values. The medians of these distributions are very close, demonstrating that despite the hypothesis about disparate impact on minorities, there is little difference in the value of land being purchased.

30. As noted earlier, the claim regarding disparate impact requires two assumptions, one that minorities will necessarily have lower incomes than whites, and a second that their purchase choices are exactly like those of whites. Historically, this doesn't seem to be the case in Brandon.

Chart 8: Boxplot Showing Distribution for Appraised Land Values by Minority Density



31. A similar chart can be presented for Appraised Improvements, but a more telling analysis would be to examine if the Appraised Improvements differ by minority group after accounting for income. This is done by using a linear regression to ascertain whether areas and appraised improvements differ by the density of minorities living in different areas of Brandon.

32. Table 1 presents the results of the first analysis, which shows whether the area of properties purchased differs by minority status after accounting for income. While not a strong prediction, it does show that the basic area of homes is related to median income, but not to the percent minority living in a block group. The coefficient on percent minority is not different than zero, meaning that it doesn't have a measurable effect on the square footage of a home once we account for median income. This is not a strong prediction, with only 6.5% percent of the variation in the area of a home accounted for median income (not strong, but still statistically significant at a very high level - < .01% chance). The columns are interpreted as follows. The column B is the coefficient applied to the variable in the predictive equation:

Area = b(1) + b(2)*Median Income + b(3)*Percent Minority + error

33. Note that the value b(1) is the intercept in the equation, denoted as (Constant) in the table. The column Std. Error is the variability around the estimate of the coefficient. The column t is a set of test statistics to determine if the corresponding coefficient B is different than zero (if not, the corresponding variable has no measurable effect in the equation), and Sig. is the measure of significance that results from the test. A value of 5% means that there is only a five percent or less chance that the parameter is close to zero (and so meaningless). A value of 0% means there is virtually no chance the coefficient is zero (meaning it is a strong predictor). In table 1, a value of 33% means that there is a 33% chance the true coefficient on the Percent Minority is zero, much worse than the accepted standard of 5% tests.

Table 1: Relation of Basic Area to Median Income and Percent Minority

	B	Std. Error	t	Sig.
(Constant)	1,236.31	34.85	35.47	0.00%
Median HH income in 1999	0.01	0.00	17.48	0.00%
Percent Minority	-55.07	56.73	-0.97	33.17%

34. A prediction of the Assessed Value of Improvements fares no better, as seen in Table 2. The R^2 value for this regression is only 2.4%, but this is still statistically significant. And as seen above in Table 1, the prediction of Assessed Value of Improvements is a function of median income, but not related to percent minority.

Table 2: Relation of Assessed Improvements to Median Income and Percent Minority

	B	Std. Error	t	Sig.
(Constant)	6,946.65	362.99	19.14	0.00%
Median HH income in 1999	0.06	0.01	10.30	0.00%
Percent Minority	-432.69	590.85	-0.73	46.40%

35. A more complex hypothesis can be tested that allows for differentiation within fixed house sizes. This test would condition on a particular basic area for a house, say 1,742 feet, the average for all houses in Brandon, and determine if the variability AROUND the associated mean ($96,781) can be accounted for by income or minority density. Previously, Chart 5 showed that the dollar value of assessed improvements tracked well with the base area – so we can use that relationship to determine if other factors are important after that base relationship. This test is shown in Table 3. The R^2 for this regression is 58%, which is the proportion of variability explained by all variables. As before, Percent Minority is not significant in the equation, meaning it has no measurable relationship to the dollars spent on improvements.

Table 3: Relationship of Median Income & Percent Minority after Accounting for Area

	B	Std. Error	t	Sig.
(Constant)	704.77	385.15	1.83	6.73%
Median HH income in 1999	-0.01	0.00	-3.12	0.18%
Percent Minority	-118.82	385.90	-0.31	75.82%
Basic Area	3.69	0.35	10.45	0.00%
Basic Area Squared	0.001	0.00	12.03	0.00%

36. The point of these three tests is that once one accounts for income, there is no difference in the purchases (appraised values of improvements) made by minorities and Whites. In each test, we found that income was the determining factor, but after accounting for the income of minorities and whites, we have the same distribution of purchases, meaning that persons with equal incomes will have the same opportunities, regardless of race.

Substitution

37. There is great diversity in Brandon, with a wide range of prices and sizes available. Increasing the minimum size of properties has a uniform effect on all people with low incomes, not solely on minorities. However, many people cannot afford a new house, just as they can't afford a new car or other luxuries. There are other choices available to all people wanting to live in Brandon, including houses that already exist that have a wide range of sizes and prices and rental properties. The Plaintiffs are implicitly arguing that the only reasonable choices are new homes that they are building rather than considering the full stock of housing in Brandon.

38. The choices currently existing in Brandon cannot be that onerous as there is anecdotal evidence that the percent of minorities in Brandon has been increasing since the 2000 Census. An examination of school enrollment records indicates that the proportion of minorities has been growing in recent years. Living in Brandon is more expensive than living in Jackson or in other closer communities like Pearl. If higher prices are a deterrent to minorities, why would the proportion of minorities be growing relative to the percent minority in these communities?

Effects on Plaintiffs

39. As noted early in this document, the Plaintiffs complaint stated "Brandon's zoning practices have necessarily and directly increased the cost of housing throughout Brandon, which will have an adverse and detrimental effect on Plaintiffs and on all members of Plaintiffs HBAM and HBAJ". No support is given for this statement, and a basic economic argument can be presented against this claim. Increasing the cost of housing in Brandon should not have an adverse and detrimental effect on Plaintiffs. Plaintiffs are builders, and as such can't claim a "disparate impact". They can only claim financial harm. Yet building a larger building should involve economies of scale. For a somewhat larger home, there is still only one fuse box to be installed, one connection of water to the city's system, and so on. Unless the Plaintiffs can demonstrate that their marginal cost of construction increases, it would seem that Plaintiffs benefit from building larger homes.

40. If the loss is due to being unable to build more homes on a smaller space, then the Plaintiffs are demanding a transfer payment coming from other parts of the city. If it costs the city a certain amount to provide basic services such as police and a fire department, having more people in a set area, with only the ability to tax based on the size of building, means the city loses money relative to the Plaintiffs. Allowing the Plaintiffs to build smaller properties without regard for the tax consequences constitutes a transfer payment since it inherently taxes the rest of the homeowners currently living in Brandon. The Plaintiffs are harmed in that they cannot capture excess revenue – revenue that they would not be able to capture if the City is allowed to recover a necessary minimum tax base to be able to provide services.

Indirect Effects

41. Finally, the Plaintiffs make the claim that "Brandon's zoning practices have necessarily and directly increased the cost of housing throughout Brandon". This claim is also not supportable under a basic economic analysis. If new homes are being built, this tends to bring down the cost of other housing, not raise it. Consider two homes that are the same in terms of location, square footage, and all other characteristics, but one is new and the other has been owned for a period of time. The newer home will command the higher price simply because it is new. To make the other home an equally viable choice, the owner has to drop its price to compete with the new homes.

42. However, when the price on the comparable house is lowered, it is now also competing with all other homes in the area, causing a ripple effect. Even if Brandon's zoning practices cause larger homes to be built, there is reason to believe that the expansion of the supply of homes will generally cause the cost of housing to decline. Plaintiffs may want to argue in response that the competition is caused by an increased demand among lower priced homes, but since lowering prices in general from the ripple effect will reach this market, there is no reason to believe that the increased competition would be contained only to a localized set of homes.

43. The alternative argument that the Plaintiffs could raise is that by limiting the number of homes that could be built, this will keep them from overbuilding and causing a general decline in prices in the housing market. This effect is being seen in communities all over the United States, to the detriment of homeowners and builders throughout the U.S. While the zoning would keep the Brandon market from following a similar crash, it is hard to understand how this causes housing prices to increase, as opposed to stabilizing.

APPENDIX 1: PAST EXPERIENCE

My background covers 30 years of research and study in the areas of statistics, economics, and their application to business problems. I am Managing Partner of Analytic Focus LLC, a company headquartered in Birmingham, Alabama. A portion of our work is conducting research in legal issues, including providing litigation support and expert witness services when requested. Some of our work focuses on measurement and mitigation of risk for financial intermediaries. The final area of our practice is in support of Federal and State agencies needing economic and financial analysis to pursue their missions. I am also a research professor in the School of Business and the School of Public Health at the University of Alabama – Birmingham.

In litigation, our firm has focused on class certification issues, intellectual property, antitrust, and regulatory compliance. In banking and insurance, we offer services regarding audit reliability, risk measurement, model validation, and optimization of operations. For regulatory agencies, we have contracts with several Federal agencies to determine risk to funds managed by the agencies or operations conducted by the agencies.

Prior to founding Analytic Focus, I was a director for ARPC, a firm in Washington, DC where I provided many of the same services currently offered by Analytic Focus. From the beginning of 1997 through the end of 1999, I was a Director for Price Waterhouse and subsequently PricewaterhouseCoopers. In this position I headed up two different staff groups, one the financial research group in the Survey Research Center (SRC) run by Price Waterhouse, the other the data mining group. Our research efforts in the SRC was in support of business to business consumer research and financial analysis and for the Federal Government to research regulatory impact. In the data mining group we provided fraud detection services for financial services organizations, optimization research for businesses concerned with supply chain issues in production, and analysis of delivery systems for a number of major delivery companies. This latter work required coordination with our supply chain group and the three directors in charge of these operations formed an "Analytical Trust" where we worked jointly on the statistical and financial aspects of the design for these programs. On the whole, we combined resources in this small group in operations research, statistics, mathematical economics, finance, and system design to answer complex analytical questions.

Before joining Price Waterhouse, I was Chief Statistician for the Federal Deposit Insurance Corporation and the Resolution Trust Corporation, where I was responsible for all research on valuation of properties and assets taken in by the FDIC and RTC in the banking crisis of the 1980s and 1990s. I also supported research into fraud, optimization of contracts with servicing companies, and consumer perceptions of their interactions with banks and savings and loans. I prepared and jointly presented results on the FDIC's consumer research to Congress, specifically the House Banking Committee in hearings on how consumers perceive what they are told regarding retail transactions in banks.

During this time, 1991 to 1996, I also served on a number of independent review committees for different Federal agencies to evaluate the quality of research conducted or research proposed for the National Institutes of Health, for the Department of Health and Human Services, for the Department of Justice, for Treasury, and for the Department of Agriculture. These committees were formed specifically to determine how to determine whether research presented to the Federal government could support conclusions drawn or to consider whether research proposed in grant applications would be adequate to study the topic in question.

I also worked for a time in the private sector as Chief Statistician and a Vice President for Opinion Research Corporation, from 1989 through 1991. In this position I helped design over 100 consumer research studies focusing on acceptance of new products, pricing, and customer satisfaction. In particular I helped to design the largest ongoing customer satisfaction study conducted in the United States for the U.S. Postal Service to investigate all aspects of consumer reactions to operations of and interactions with the Postal Service.

From 1986 through 1989, I was the first Chief Statistician for the newly founded National Center for Education Statistics, an agency within the Department of Education. As the Chief Statistician I was responsible for the design of all surveys and research conducted by NCES, reports to Congress on the state of education in the U.S. and in the world, and on staff development in research methods. In particular, under my guidance, NCES was one of the first Federal statistical agencies to publish standards for operations and research. These standards are still required for the conduct of research by all NCES staff and all contractors working with the NCES.

From 1975 through 1986 I held a variety of positions at the U.S. Bureau of the Census, including Chief of the Survey Design Branch, where I was responsible for the technical aspects of all research conducted on the evaluation of surveys and the 1980 Decennial Census. I also designed research studies on the validity of surveys conducted by the Census Bureau, experiments to measure response validity, and helped a number of countries develop research programs regarding their economic and demographic research programs.

My first positions after graduation were with the Institute for Social Research at the University of Michigan and as Manager of the Survey Research Center at Oregon State University.

During this time I served on a number of different committees in professional associations including the American Statistical Association, the American Association for Public Opinion Research, and the Research Industry Coalition, including the presidency of the latter. For each of these associations I was involved in issues of ethics and professional standards in the research community.

I have also served as an adjunct or visiting professor at a number of universities, besides my current positions as an adjunct at UAB. I have also been an adjunct professor teaching statistics at the George Washington University and a visiting research professor at the University of Illinois.

APPENDIX 2: RESUME

CHARLES D. COWAN, PH.D.
ANALYTIC FOCUS LLC

Key Qualifications
Charles D. Cowan is Managing Partner of ANALYTIC FOCUS LLC. Dr. Cowan has 30 years of experience in statistical research and design. He consults for numerous public and private sector entities on the design, implementation, and evaluation of research and the synthesis of statistical and sampling techniques for measurement.

Dr. Cowan has designed some of the largest and most complex research programs conducted by the Federal Government, including the Post Enumeration Program conducted by the Bureau of the Census to evaluate the 1980 Decennial Census, the Economic Cash Recovery valuations conducted by the Resolution Trust Corporation in 1990-95, and many evaluation studies conducted for the Justice Department, the Department of Defense, the Department of Housing and Urban Development, and the Treasury Department. He has provided expert advice to corporations and government agencies on the incorporation of complex research designs in demographic and economic measurement problems, including:

- Development of procedures used by the Resolution Trust Corporation and the FDIC for determination of the value of all assets held by the RTC\FDIC taken from failed banks and S&Ls. During the 1990s, there were hundreds of thousands of assets taken into receivership when financial institutions failed, and these assets varied from large commercial loans to the furniture and fixtures of the institutions itself. Results from this research were used in quarterly reports to Congress on the loss to the American taxpayer that resulted from these failures. These estimates of anticipated recoveries on assets were also used by the RTC and FDIC for financial reporting, leading these agencies to their first clean opinions from the GAO in their annual review of agency financial statements.

- Establishment of audit and sampling methods to determine the completeness and reliability of reporting and record systems. These procedures were used to both expand and streamline bank examinations for safety and soundness and also compliance measurement for the FDIC. These sampling techniques have also been applied in banks and the audit of other Federal agencies concerned with regulatory review of operations and systems, such as regulatory reporting forms, accounts payable and receivable, travel records, and litigation related systems for banks, regulatory agencies, and law firms;

- Application of econometric and biometric procedures for measurement of credit risk in large portfolios of loans. These models are frequently used for a variety of purposes within financial institutions, such as the pricing of loans, the management of customers long term, decision making on workouts for delinquent loans, and for establishment of economic and regulatory reserves.

- Evaluation of research conducted for the Department of Defense, for the National Institutes of Health, and for the Department of Agriculture, each in response to Congressional inquiries on the validity of published results, and also for nonprofit institutions, and for defendants in several lawsuits involving evidence proffered by plaintiffs in furtherance of their suit.

- Model fitting and development of projection methods to measure the likelihood of loss or errors in recording in loans held by banks or put up for auction; measurement of the likelihood of fraud and/or noncompliance in systems, including bank holding companies, trading activities for brokers, and systems for compliance with health department and judicial requirements;

- Incorporation of population demographic models with financial assessment models to predict risk for insurance companies and corporations in terms of number and value of potential claims in mass tort litigation.

- Development of procedures used by the Bureau of the Census for apportionment of population for revenue sharing purposes and the estimation of the undercount in the Decennial Census of Population and Housing. These procedures include application of capture-recapture methods to measure the size of the undercount in the decennial census, use of network sampling as an alternative measure for population size, and measurement of the reliability of data collected in the Census.

- Development of statistical methods to quantify the size of populations, including nomadic populations for the Census of Somalia, the undercount and overcount in the Census of Egypt, the number of missing children in Chicago, IL, and the number of homeless persons and families needing services in several large cities with transient populations.

Dr. Cowan teaches graduate and undergraduate courses in survey methods, statistics, and computer methods for analysis. He is the co-author of two books, one on evaluation of survey and census methods and one on econometric measures related to the welfare of the U.S. economy. He has written numerous articles on statistical methods, sampling, rare and elusive population research, and optimization techniques.

Prior to cofounding ANALYTIC FOCUS LLC, Dr. Cowan was a Director with ARPC and with Price Waterhouse, where he specialized in financial research, survey research, and audit sampling. From 1991 to 1996, Dr. Cowan was the Chief Statistician for the Resolution Trust Corporation and the Federal Deposit Insurance Corporation, where he designed research necessary to measure the loss from the Savings & Loan Crisis of the late 1980's and capitalization requirements for the RTC funds from the U.S. Treasury. Dr. Cowan also served as the Chief Statistician for the U.S. Department of Education, where he designed large-scale surveys of educational institutions to measure resource needs and availability, and for Opinion Research Corporation, where he designed predictive models of demand for automobile manufacturers, banks, and large horizontally diverse firms like GE and AT&T. Dr. Cowan worked for the U.S. Bureau of the Census, where he was the Chief of the Survey Design Branch and developed many of the techniques in use today for the evaluation of coverage in surveys and censuses.

Education
Ph.D., Mathematical Statistics, The George Washington University, 1984
M.A., Economics, The University of Michigan, 1973
B.A., English and Economics, The University of Michigan, 1972

PROFESSIONAL EXPERIENCE
Co-Founder, ANALYTIC FOCUS LLC, January, 2002 to present.
Director, ARPC, November, 1999 to December, 2001.
Director, PricewaterhouseCoopers LLP, January 1997 to November, 1999.
Chief Statistician, Federal Deposit Insurance Corporation / RTC, 1991 to 1996.
Chief Statistician, Opinion Research Corporation, 1989 to 1991.
Chief Statistician, National Center for Education Statistics, U.S. Department of Education, 1986 to 1989.
Bureau of the Census: Assistant Division Chief, International Statistical Programs Center, 1984 to 1986; Staff Liaison for Statistical Litigation Support, 1983 to 1984; Chief, Survey Design Branch, Statistical Methods Division, 1978 to 1983; Acting Chief, Survey Analysis and Evaluation Branch, Demographic Surveys Division, 1976 to 1978; Office of the Chief, Statistical Research Division, 1975 to 1976
Survey Research Center, Oregon State University: Manager, 1974 to 1975
Institute for Social Research, U. of Michigan: Assistant Study Director, 1972 to 1974.

Professional Associations
Adjunct Professor, Statistics, University of Alabama – Birmingham, 2002-2004.
Associate Professor, Statistics, George Washington University, 1993 - 1998.
Visiting Research Professor, Survey Research Laboratory, U. of Illinois, 1983 - 1989.
Consultant, Dept. of Community Psychiatry, Johns Hopkins U., July 1985 - Dec 1987.

Professional Societies - Positions
President, Research Industry Coalition, 1999-2000
Council Member, Research Industry Coalition, Representative from ASA, 1995-2000
President, Washington/Baltimore Chapter of American Association for Public Opinion Research (AAPOR), 1998
Program Chair, American Association for Public Opinion Research, 1991-2
Program Chair, Section on Survey Research Methods, American Statistical Association (ASA), 1989-90
Secretary-Treasurer, AAPOR, 1985-1986
Associate Secretary-Treasurer, AAPOR, 1984-1985
Editorial Board, Public Opinion Quarterly, 1980-1984
Editorial Board, Marketing Research, 1989-2000
Chair, Conference Committee, AAPOR, 1982-1989
Chair, Committee on Privacy and Confidentiality, ASA, 1980-1981

Professional Societies – Memberships
American Statistical Association
International Association of Assessment Officers

Publications

Strumpel, Burkhard; Cowan, Charles; Juster, F. Thomas; and Schmiedeskamp, Jay; editors, Surveys of Consumers 1972-73, Contributions to Behavioral Economics, Ann Arbor: The Institute for Social Research, 1975.

Duncan, Greg, and Cowan, Charles D., "Labor Market Discrimination and Nonpecuniary Work Rewards" in Surveys of Consumers 1972-73, Contributions to Behavioral Economics, Ann Arbor: The Institute for Social Research, 1975.

Curtin, Richard T. and Cowan, Charles D. "Public Attitudes Toward Fiscal Progress" in Surveys of Consumers 1972-73, Contributions to Behavioral Economics, Ann Arbor: The Institute for Social Research, 1975.

Cowan, Charles D., and Spoeri, Randall K., "Statistical Distance Measures and Test Site Selection: Some Considerations", Proceedings of the Computer Science and Statistics: Eleventh Annual Symposium on the Interface, 1978.

Bushery, John R., Cowan, Charles D., and Murphy, Linda R., "Experiments in Telephone-Personal Visit Survey", Proceedings of the American Statistical Association, Section on Survey Research Methods, 1978.

Spoeri, Randall K., and Cowan, Charles D., "On the Use of Distance Measures in Test Site Selection: A Practical Application Using Census Data", Proceedings of the American Statistical Association, Section on Business and Economic Statistics, 1978.

Hogan, Howard, and Cowan, Charles D., "Imputations, Response Errors, and Matching in Dual System Estimation", Proceedings of the American Statistical Association, Section on Survey Research Methods, 1980.

Schwartz, Sidney H., Cowan, Charles D., and Sausman, Kenneth R., "Optimization in the Design of a Large-Scale State Sample", Proceedings of the American Statistical Association, Section on Survey Research Methods, 1980.

Cowan, Charles D., "Modifications to Capture-Recapture Estimation in the Presence of Errors in the Data" presented at the meetings of the American Statistical Association, Biometrics Section, 1982 (no proceedings).

Cowan, Charles D. "Interviews and Interviewing", The Social Science Encyclopedia, Routledge and Kegan Paul, Publishers, The Netherlands, 1984.

Wei, L. J. and Cowan, Charles D. "Selection Bias", Encyclopedia of Statistical Science, John Wiley and Sons, New York, N.Y., 1984.

Cowan, Charles D. and Malec, Donald J. "Capture-Recapture Models When Both Sources Have Clustered Observations", Journal of the American Statistical Association, June 1986, Vol. 81, # 394, pp. 347-353, and Proceedings of the American Statistical Association, Section on Survey Research Methods, 1984.

Cowan, Charles D. The Effects of Misclassification on Estimates from Capture-Recapture Studies. Unpublished doctoral dissertation, The George Washington University, September 1984.

Cowan, Charles D. "Misclassification of Categorical Data", Proceedings of the American Statistical Association, Section on Survey Research Methods, 1985.

Cowan, Charles D., Biemer, Paul P., Magnani, Robert J., and Turner, Anthony G., Evaluating Censuses of Population and Housing, Statistical Training Document, ISP-TR-5, U.S. Department of Commerce, Bureau of the Census, 1985.

Cowan, Charles D., Turner, Anthony G., and Stanecki, Karen "Design of the Somali Post Enumeration Survey (1986-1987)", Proceedings of the American Statistical Association, Section on Survey Research Methods, 1986.

Cowan, Charles D., Breakey, William R., and Fischer, Pamela J. "The Methodology of Counting the Homeless", Proceedings of the American Statistical Association, Section on Survey Research Methods, 1986.

Cowan, Charles D. and Malec, Donald J. "Sample Allocation for a Multistage, Multilevel, Multivariate Survey", Proceedings of the Fourth Annual Research Conference (ARC IV), U.S. Bureau of the Census, 1988.

Frey, Carolin M., McMillen, Marilyn M., Cowan, Charles D., Horm, John W., and Kessler, Larry G., "Representativeness of the Surveillance, Epidemiology, and End Results Program Data: Recent Trends in Mortality Rates", Journal of the National Cancer Institute, Vol. 84, No. 11, June 3, 1992.

Cowan, Charles D., Breakey, William R., and Fischer, Pamela J. "The Methodology of Counting the Homeless, A Review" in Homelessness, Health, and Human Needs. Institute of Medicine, National Academy Press, National Academy of Sciences, Washington, D.C., 1988.

Cowan, Charles D., "Standards for Statistical Surveys in the Federal Government: Practices in the Center for Education Statistics", Proceedings of the American Statistical Association, Section on Survey Methods Research, 1988.

Sudman, Seymour, Sirken, Monroe G., and Cowan, Charles D., "Sampling Rare and Elusive Populations", Science, Vol. 240, pp. 991-996, May 20, 1988.

Cowan, Charles D., "Mall Intercepts and Clinical Trials: The Philosophy of Inference from Different Types of Research Designs" in Marketing Research: A Magazine of Management & Applications, Vol. 1, No. 1, March 1989.

Cowan, Charles D., "Mall Intercepts: Principles of Design for Research" in Proceedings of the Seventh Annual Advertising Research Foundation Research Quality Workshop, September, 1989.

Cowan, Charles D., "Estimating Census and Survey Undercounts Through Multiple Service Contacts" in Housing Policy Debate: Counting the Homeless: The Methodologies, Policies, and Social Significance Behind the Numbers, Volume 2, Issue 3, pp. 869-882, 1991.

Cowan, Charles D., "Ratio vs. Regression Estimators in a Large Scale Survey of S&L's" in Proceedings of the Section on Survey Research Methods, American Statistical Association, 1992.

Cowan, Charles D., "A Longitudinal Survey and Reality Check for the Value of Financial Assets" in Proceedings of Statistics Canada Symposium 92: Design and Analysis of Longitudinal Surveys, November 1992.

Cowan, Charles D., and Wittes, Janet, "Intercept Studies, Clinical Trials, and Cluster Experiments: To Whom Can We Extrapolate?" in Controlled Clinical Trials, Vol 15, pp 24-29, 1994.

Cowan, Charles D., and Klena, Matthew K. "Use of the EM Algorithm for Allocation of Proceeds from Auctions and Bulk Sales" in Proceedings of the Section on Business and Economic Statistics, American Statistical Association, 1995.

Cowan, Charles D., "Coverage, Sample Design, and Weighting in Three Federal Surveys" in Journal of Drug Issues, October, 2001.

Cowan, Charles D., "Use of Mass Appraisals in Toxic Tort Litigation Involving Loss of Value" in Proceedings of the International Association of Assessment Officers, October, 2002.

Cowan, Adrian M. and Cowan, Charles D., "Default Correlation: An Empirical Investigation of a Subprime Lender", The Journal of Banking and Finance, March 2004.

Keith, Scott W. , Wang, Chenxi, Fontaine, Kevin R. , Cowan, Charles D. and Allison, David B. , "Body Mass Index and Headache Among Women: Results From 11 Epidemiologic Datasets", Obesity (forthcoming, 2008)

Cowan, Charles D., and Cowan, Adrian M., "Quasi-Likelihood Estimation of Loan Portfolio Defaults in the Presence of Default Correlation and Autocorrelation", The European Journal of Finance (forthcoming, 2008)

APPENDIX 3: PAST TESTIMONY

PAST EXPERIENCE AND RATES – CHARLES D. COWAN

Trademark Infringement:
Quiksilver v. Brunswick, circa 1997. Deposed, case settled. Worked for the defendant, who had started producing t-shirts under brand name Quicksilver, one of their boat lines. The boat line could be named Quicksilver, but Quiksilver produces "surfer" clothes and were concerned about trademark confusion. We conducted a survey to determine level of confusion and the likely damages caused. Brunswick dropped the t-shirt line and settled.

St. Johns Knits versus St. Johns, circa 1997. Deposed, case settled. Small firm in California named itself St. Johns and began to produce ladies casual apparel with name of St. Johns. Worked for plaintiff, conducting survey on trademark confusion and calculating damages.

Nitro Leisure Products v. Acushnet. **Antitrust,** Trademark, and Deceptive Sales Practices filed in Florida. Deposition in 2003, settled in 2004. Worked for defendant. Issue was whether claims regarding the performance of "used and repackaged" golf balls were valid. Survey conducted, used to support damage claims. Second simultaneous suit was Acushnet v. Nitro – work used in settlement of the two simultaneously.

Community First Bank v. Community Banks. Trademark infringement. Deposition, October, 2004. Worked for Defendant. Issue was that Pennsylvania based Community Banks, a multi-state bank, opened branches in Northern Maryland. Community First Bank claimed it already had a charter in Maryland and the intrusion of Community Banks diminished the value of their name. Case resolved in favor of Defendant – dismissal on Summary Judgment.

Trade Dress
Sound Board Manufacturer v. European Manufacturer. Trade dress infringement. Worked for plaintiff. Circa 1997. Issue was that European manufacturer bought a sound board from U. S. manufacturer, reverse engineered it, and sold their copy with exactly same layout and design in competition with U.S. manufacturer. Conducted survey of bands, churches, small recording studios, and other potential purchasers of mid-price sound boards. Case settled.

Clothing Manufacturer v. Clothing Manufacturer. Trade dress infringement. Worked for plaintiff. 2004. A manufacturer of camouflage hunting clothes developed a unique camouflage design and used it for their primary line of clothes. A second manufacturer bought materials from same fabric company and produced exactly the same design for hunting clothes sold in similar outlets to the same population of hunters. Survey designed and implemented. Case settled.

Manufacturer of liquid energy drinks v. manufacturer of liquid energy drinks. Trade dress infringement. Worked for defendant. 2006-7. A manufacturer of liquid energy drinks sold in gyms, health clubs, and big box retailers filed suit against another manufacturer of liquid energy drinks, claiming that the shape and type on the bottles of the defendant were the same as that of the plaintiffs and caused confusion among potential purchasers. Conducted surveys of potential purchasers of liquid energy drinks to determine whether confusion exists. Deposition in January, 2007, testimony in bench trial in January, 2007. Defendant won.

Patent Infringement:
Smith & Nephew v. Zimmer, circa 1999. Deposed, then case settled. Worked for defendant who admitted infringing on patent but claimed that the particular feature upon which they infringed was not important to the choice of the product by physicians. Product was hip replacement "cup" and "stem", and feature was machining of cup to minimize friction. We conducted a survey of physicians to determine what features were important to the selection of a hip replacement part. We used the survey to calculate damages; results were used in the settlement deliberations.

Disparate Impact \ Discrimination
Loss of jobs, loss of work hours, lack of promotions for population of blacks working for a manufacturer who laid off blacks first, re-hired (called back) blacks last, refused to promote, and kept overtime for only certain workers. Worked for plaintiffs. Analysis of hiring practices, lay off records, filings with Federal government, and other records to develop pattern of practice analysis. Case settled, no testimony.

Disparate impact in promotions for minority workers for a large public utility. Worked for plaintiffs. Analysis of testing and promotion procedures, development of methods to ascertain if skill tests used led to disparate treatment of minorities. Report submitted, case ongoing.

Disparate impact for senior citizens for a public housing authority. Worked for city housing authority – plaintiff. Survey of senior citizens in a city to determine their attitudes and beliefs regarding different Federally sponsored senior citizen independent living facilities. Analysis of demography of general population in the city and comparison to distributions of residents in all independent living facilities in the city. Report and affidavit submitted, case ongoing.

Disparate impact for minorities in availability of cemetery plots in multiple cemeteries owned by single holding company. Analysis of sales of plots to individuals to ascertain whether a pattern of practice existed. Worked for defendant. Case ongoing.

Deceptive Sales Practices:
Executech v. Appleton Papers, circa 1998. Deposed, testified at class certification hearing. Class denied. Issue was whether Appleton Papers colluded with other manufacturers in the pricing of thermal fax paper products. Appleton had already won an antitrust case in Federal court on same issue. Conducted survey of pricing of product throughout Florida and proved that pricing of product was so discretionary at retail level that it was impossible to consider whether producer pricing had claimed impact at retail level. Case cited by Third District Court in Florida when tobacco class ruling in Florida was overturned on appeal.

Watkins et al. v. Dry Cleaners International, 2003. Not deposed, case settled before class hearing. Worked for defendant. Issue was whether DCI had properly informed customers of surcharge imposed to cover environmental costs. Plaintiffs claimed customers were confused and thought charge was improperly imposed tax. Survey conducted, damages calculated.

Fidelity Mortgage v. Seattle Times. Deceptive Trade Practices in Seattle Washington. Deposition in 2004. Worked for plaintiff. Damages calculated on lost sales because of publication of false interest rates. Case in appeals court.

Deceptive Sales practices case in California involving Botox, representing the cosmetics manufacturer. Worked for defendant. Deposed in 2004, case dismissed.

Toxic Tort:
Three separate **Toxic Tort** property value diminution cases filed in Florida between 1998 and the present. Deposition for the largest and latest case in 2001. All three cases were environmental contamination cases, with class actions brought against manufacturer. Worked for defense in all three cases on class certification issues and damages calculations. Deposed in last case. First Case class was not certified, Second case settled. Third: Bernice Samples, et al, v. Conoco, Inc.; Agrico Chemical Company; and Escambia Treating in the Circuit Court of the First Judicial Circuit in and for Escambia County, FL. Division: "J", June 2002, Deposition; Case settled.

Other Antitrust:
North Jackson Pharmacy, Inc. et al v. Express Scripts, Inc. et al. Independent Pharmacies filed an antitrust case against Pharmacy Benefit Managers (PBMs). Worked for plaintiffs. Deposed in July, 2005; class certified.

North Jackson Pharmacy, Inc. et al v. Caremark Pharmacies filed an antitrust case against Pharmacy Benefit Managers (PBMs). Worked for plaintiffs. Deposed in May, 2006; class certification pending.

Other cases:
Castro v. Ford Motor, Inc. **Wrongful Death** Suit filed in California. Deposition and Testimony in 2001. Worked for defendant. Survey used in case regarding use of Ford Explorers by the general public. Critiqued survey and damages calculations as rebuttal expert. Jury found in favor of Ford.

Mullinax v. Buffalo Rock. **Wrongful Death** Suit in Alabama. Deposition and Testimony in 2004. Worked for plaintiff. Sampling of trucks from Pepsi bottling plant taken and analyzed to demonstrate that Pepsi \ Buffalo Rock drivers frequently speed, even after plaintiffs mother was killed by speeding fully loaded truck. Results were that 70 to 80 percent of trucks were observed speeding during a three month period, and 90 percent of "roll-up" trucks were speeding during this period. Jury found in favor of plaintiff with sizable award.

Loss of value case regarding employee stock options when business owner was indicted on fraud and malfeasance charges. Worked for plaintiff. Case settled, no testimony.

Loss of value case regarding value of a business when a contract was wrongfully terminated. Worked for plaintiff. Case ongoing, no testimony yet.

Lost value and population estimates for population affected in a marketing case where a franchisor allowed a new franchise to be built in the "blocked area" around an already existing franchise. Worked for plaintiff. Case settled – deposition, January 2006.

Construction Defects Damages case regarding the calculation of damages based on a sample of housing units inspected and resulting damages extrapolated to the full population of units built in a new subdivision. Worked for defense. Case ongoing – deposition, May 2007.